

DOCUMENT RESUME

ED 213 052

CS 503 753

AUTHOR Phillips, Gerald M.
TITLE A Model for Scientific Validation of Critical Advisories.
PUB DATE May 81
NOTE 22p.; Paper presented at the Annual Meeting of the International Communication Association (Minneapolis, MN, May 21-25, 1981).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Evaluation Criteria; *Generalization; Higher Education; *Scientific Methodology; Scientific Principles; *Speech Communication; *Speech Instruction; Student Teacher Relationship; *Teacher Role

ABSTRACT

Intentional, conscious speech is composed of both scientific and artistic components and thus requires instruction from both perspectives. Teachers often employ nonvalidated propositions--derived from personal and vicarious experience, results of scientific investigations, or folk wisdom--to advise students on speech performance. Care must be taken in translating scientific findings into a technology of speech improvement. But regardless of where teachers derive critical guidelines, the proper use of criticism requires a scientific approach characterized by the development and testing of hypotheses about the effect of particular changes and positively defined outcomes. The student speaker represents a population of behaviors, each of which is amenable to some kind of experimental analysis. The task of the teacher is to derive sound advice from scientists who study general behavior as a basis for a particular hypothesis about the behavior of a given person in a given case. Application of an understanding of scientific investigation to the derivation of critical principles acts as a method of criticizing generalizations, so that even if a false or useless generalization is selected by the teacher, individually testing it with particular speakers can provide an empirical base for decisions about its utility. (HOD)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED213052

A MODEL FOR SCIENTIFIC VALIDATION OF CRITICAL ADVISORIES

by

Gerald M. Phillips

The Pennsylvania State University

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

This document has been reproduced as
received from the person or organization
originating it.

Minor changes have been made to improve
reproduction quality.

Points of view or opinions stated in this docu-
ment do not necessarily represent official NIE
position or policy.

Submitted to: John Daly
Department of Speech Communication
University of Texas
Austin, TX 78712

For consideration for ICA Instructional Communication Division

Gerald M. Phillips
Department of Speech Communication
Pennsylvania State University
University Park, PA 16802

814 - 865 - 3461 (Office)
814 - 238 - 2943 (Home)

PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

Gerald M. Phillips

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

C 5583753

A MODEL FOR SCIENTIFIC VALIDATION OF CRITICAL ADVISORIES

The Teacher and Science

Phillips (1978) declared that a technology of criticism of speech acts could be derived from heuristic questions based on five assumptions:

1. Speech is a goal directed enterprise.
2. Speech is a process and a relationship.
3. The social milieu in which speech takes place restrains and constrains the speaker.
4. The speaker selects his rhetorical behavior from a pool of possibilities.
5. A perpetual audit of effectiveness is carried on by the speaker.

He concluded that it was appropriate for teacher/critics to derive the premises on which they based critical directives from the findings of scientific investigations. It is the purpose of this paper to examine the potential of scientific study to advise instruction in communication and to attempt to generate some productive lines of investigation on which a useful directive pedagogy can be based. This assumed a model of speech instruction which consists of advice, performance, criticism, performance, etc.

Man, according to N. K. Humphery (1978), evolved intelligence "because it takes high intellectual skills to survive in a social community." Intellectual competency is expressed through both art and science which, Jaynes (1976) argues are becoming more and more unified. Accordingly, a human act such as conscious and intentional speech could be construed as both a scientific and artistic form. Says Nisbet (1976, p 19):

...The problems, insights, ideas and forms which come to the artist and to the scientist seem to come as often from the unconscious as the con-

scious mind, from wide, eclectic and unorganized reading, observing or experiencing, from musing, browsing, and dreaming, from buried experience, as from anything immediately and consciously in view. They come... as often from the left handed processes of feeling and intuition as from the right-handed channels of logic, empirical directness and reason.

This statement suggests that intentional, conscious speech is composed of both scientific and artistic components and thus requires instruction from both perspectives. To date, advisories addressed to student speakers have been rooted in the writings of classical and contemporary rhetoricians and have represented an artistic logic of performance rather than a body of empirical findings. While conscious speech is derived from intelligence involving both right and left brain (Geschwind, 1979), the traditional canons have been traditionally locked in artistic kinds of speculations. While mind itself defies understanding (Penfield, 1975), there appears to be sufficient order in conscious, intended speech to warrant the effort to attempt to provide instruction from a scientific perspective as well.

As a first step, it is important for the critic to learn to evaluate scientific information before using it as a basis for critical advisories. The teacher/critic is generally not a scientist, nor trained in scientific method. He receives his claims in the form of argument for or against conclusions. While it is often convenient to select scientific advice that confirms whatever common wisdom is most comfortable, that is not the purpose of science. Rather, parts of the common wisdom can be reinforced, others discarded as the result of scientific investigation. Before attempting this kind of judgment, however, an examination of the rhetorical method of science must take place.

The Nature of Science as Argument

Products of mind, science or art, are expressed in symbols and, therefore, are not truths themselves but arguments with varying degrees of probability. There has recently been a spate of scholarly efforts to evaluate scientific argument (Weimer, 1977; Overington, 1977; Baltimore, 1978; Swazey, 1978). There seems to be agreement on the proposition that phrasing scientific conclusions in symbols puts science into the rhetorical arena. People acquire knowledge from conclusions to which they ascribe credibility. Says Wheelis (1977, p 81) "knowledge is the name we give to those of our opinions to which certainty is ascribed." Ascription of certainty may be based on the quality of the argument offered, but it also may be based on how well the conclusions serve the emotional needs of the consumer. Any assertion of scientific "truth" can generate argument which, "fuelled by competition among the various perspectives and techniques...leads to scientific progress." (Wilson, 1978, p 9). Argument can also obfuscate and retard acceptance of propositions of great merit. The contention among scientists for the honor of reporting the discovery of the double helix, for example, seemed to retard the discovery for several years and scientists battled each other before their peers. This illustrates the degree of confusion which can be generated from scientific argument (Judson, 1978). Currently, social scientists are in a state of vast confusion about the relationship between heredity and intelligence, for example (Report on Education Research, 1978) while a donnybrook of massive political proportions has been raging over the credibility of sociology for several years (Caplan, 1978). The extent to which exchange of argument characterizes the scientific enterprise, social or otherwise, demonstrates that science is not a process of revelation of truth but rather an exchange of views from which trained monitors can extract useful ideas (Baker, 1980, p 84).

The technology of criticism of intentional speech, public or private, commences with the establishment of norms based on value decisions about what constitutes good or effective speech (Kwant, 1967, p 19). The teacher/critic selects directives designed to improve performance in the direction of the pre-set standards. The process is guided by a moral principle about the value of the goal (Edel, I, 1979, p 276) and is arguable but not demonstrable. It is also guided by a hypothesis about the relationship between a particular behavior and the outcome of the speech. Regardless of the source of the directive, the effect of the directive is amenable to scientific observation, and, as a matter of fact, if the teacher/critic values the goal, then directives should be tested for efficacy and not accepted uncritically. In any case, a speaker may fail because of ineptitude at taking the advice offered by the teacher/critic. On the other hand, if the action proposed by the teacher/critic does not, in itself, abet goal attainment, then the action is not worth doing. The connection between action and outcome is not an artistic relationship. Whether the teacher/critic feels that they are connected is not sufficient: the connection must (and can) be demonstrated through experiment or observation. Suggestions like, "use more gestures and you will sustain attention" or "the audience will be more likely to change if you use greater variety in proof" are fairly typical of the teacher/critic. Whether or not the speaker does what he has been advised to do can be checked directly. Whether he improves the outcome is a matter of judgment. Whether the action and the outcome are connected causally is a matter for scientific argument.

The proposition here is for a technology of criticism derived both from findings of studies conducted for the purpose of advancing knowledge and from empirical test on the part of the teacher/critic. Science is not necessarily created to serve technology (Edel, II, 1980, p 240) although some technology

can grow into scientific generalizations through validation of technological assumptions. The burden of proof is on the technologist to discover the utility of the scientists findings (Landes, 1980). The user of scientific propositions as technological hypotheses has two obligations: first, to extract propositions from science which is properly argued, second, to make an adequate connection between the proposition extracted and its use (Brooks, 1980, p 66), and third to be able to defend the morality of the goal to which the advisory is addressed (Edel, II, 1980). Notice the blend of science and art in these obligations. Innovation, that is, the generation of effective technological propositions is the result of empirical demonstration and critical evaluation. Thus, the teacher/critic must know how to evaluate the arguments offered by scientists on behalf of their generalizations, as well as to understand the critical-artistic development of goals to which the generalizations are directed. The analogy would be the design of buildings by an architect. The color, decor, ambience, and style of the building represents a goal which is achieved in mundane fashion by combining building materials according to sound technological regulations.

The Criticism of Scientific Argument

It is the purpose of this section to examine the critical standards commonly applied to evaluation of scientific argument for the purpose of extracting heuristics that underlie a technology of improvement. In this case, we will use the five assumptions with which we started as the goals of technical improvement.

Science does not argue, but scientists do. Science is presented through oral or written reports which consist of documentation of some assertion, usually through the test of a hypothesis. Evidence is offered to support the claim of credibility for the conclusion drawn. The evidence and reasoning of scientific argument is amenable to criticism, as is the conclusion.

Scientific argument is addressed to a particular audience, an elite (Moynihan, 1975, p 35), sometimes known as a "scientific community." The audience consists of people ostensibly able to judge who read the journals or books in which the reports are presented, or listen to the reports at scholarly meetings. Scientific argument is not addressed to the untrained (Miller, 1969, p 53). The teacher/critic who seeks propositions on which to base technology of improvement must be able to understand the methodology of the investigation as well as the reasoning through which the conclusion was derived. Uncritical acceptance of findings simply because they appear scientific guarantees nothing more than perseveration of folk wisdom and myth which cannot be validated (O'Flaherty, 1980). Most important, the scientific conclusion must be related to the situation it is supposed to modify rather than selected for its availability and appeal (Phillips, 1974, p 151).

Bernal (II, 1965, p 649; IV, p 1291) suggests that in order for a scientific argument to be acceptable, it must offer something needed by the community that uses it. Arrold (1974, p 67) seems to be saying essentially the same thing about non-scientific argument, when he points out that effective argument leads the listener to follow logical paths prescribed by the arguer. Thus, audience for artistic, scientific, and even critical argument appear to follow similar paths to credibility. They believe the arguer because they find the evidence and reasoning to justify their beliefs. There is both a personal and public logic involved, and argument which appeals to prevailing values appears to prevail in any given case. As Kuhn (1960, p 200) says, "we can account for scientific progress by examining the values of the group that accepts it..." for, indeed, "...a community of specialists will ultimately find one set of arguments rather than another decisive."

The frailty of basing certainty on general acceptance is most severe in the social sciences where validity is not as available as in biology or physics (Woolf, 1961). Methodology itself is often the product of consensual decisions and sometimes for purposes other than its utility in discovery. Moynihan (1970) commented that "the social science methodology is now quite beyond the comprehension of non-social scientists. Thus, a priestly role of interpreting mysteries is gradually emerging, and with it, the declericalism of non-priestly societies," the result of which is a concentration of power derived from being the only ones who can use and understand the methodology. This kind of agreement creates a tautology which permits the rejection of scientific investigations which do not use the accepted methodology.

Many authorities have responded negatively to this mode of control. Warwick (1975) for instance, indicts social science to avoiding ethical questions in favor of specification of methodology. Baken (1972) complains about excess reliance on experimentation instead of what he calls "a larger empiricism." Gouldner (1970) deplores the lack of "rational discourse about social worlds," while Koch (1969) argues that social science cannot even be a legitimate field of inquiry because it regards knowledge as the "result of processing rather than discovery. The consumer of scientific findings must be able to discriminate the conclusions which validate the methodology from those useful in forming a technology. Most important is to recognize that much of the methodology in social science is metaphoric and thus distorts the event being studied (Sarbin, 1969).

For example, numbers are often used as metaphors for things or events. The things the numbers represent are presumed to behave sufficiently like numbers to that conclusions about the behavior of numbers can be extrapolated to the things.

This metaphor, applied to human beings, is hard to defend, and though numbers themselves are logical in behavior they often cannot be applied to the apparently illogical behavior of human beings. One authority (Wert, 1954, p 92) deplores that research situations in education and psychology do not parallel the basic assumptions for the use of the statistical method. This means that conclusions drawn from studies in which numbers are used to represent entities are themselves questionable. Authorities such as Kaplan (1964) advise caution in attempting to apply numeric conclusions without first exploring the possibility that the situation to which the conclusions are to apply differs from the experimental condition in some important way. Such cautions are not commonly heeded as exemplified by the rejection of Coleman's (Education Daily, 1978) recanting of his own findings about integration or the flurry of criticism (Wheeler, 1973; Phillips, 1976; Carpenter, 1974) that has centered around Skinner's (1971, 1973) claims about the power of the scientific method.

Science, despite its claims to accuracy, cannot escape arbitrariness (Chein, 1972, p 327). Every component of scientific investigation is arguable, from the selection of an object of study to the arguments on behalf of the conclusions and particularly, the methodology selected. For example, evidence from observation raises questions about the reliability of human observers or the limitation of instrumentation (Kaplan, 1964, p 137) while generalizations from samples require an inductive leap from sample to population and from statistic to reality (Huppe and Kaminsky, 1957, pp 171-172). Evidence derived from the testimony of authorities is subject to a standard criticism (Rothstein, 1970) while noetic revelation is only as credible as the person who receives it is reliable and the person who believes it is gullible. Science itself must compete for credibility with such modes of discovery as auguries, astrology, necromancy, I Ching, etc. (Ogilvie, 1977) and the person who chooses to accept it is obligated to offer reasons why.

The teacher/critic seeks scientific findings that can be translated into advice to a student about what to do in order to accomplish some objective which teacher and student agree is desirable. It is possible to take advice, execute it well and still fail. This may mean the advice is invalid. It is also possible to fail and distort the reality by claiming success, and it is possible to succeed in spite of following the advice offered. The recent refutation of the famous Hawthorne Studies (Parsons, 1974) demonstrates that findings are revisable, and any technology is open to revision once their basis has been cast in doubt. Overthrowing accepted premises is a political activity. For example, Christie's (1978) indictment of Adorno's research as politically biased was generally rejected because Christie did not have appropriate political credentials himself.

The pedagog, often mystified by the clamor of scientific argument can regard all such argument as a pool of possibilities from which to draw, and lay it alongside his own experience, vicarious experience, and folk wisdom as a source of a technology of criticism. He must choose from contending views in order to find an application which can be defended, precisely as Bartley (1962) describes the general process of activating scientific findings into socially useful technology. The teacher/critic can maintain religious and moral bias for both Campbell (1975) and Wilson (1972) point out that the ends of science cannot themselves be defended scientifically. The teacher/critic must employ his own will and take responsibility for the results of his selection (Farber, 1969) when he attempts to apply general conclusions to the given case. In the absence of revealed truth or a way to derive it, it is the examination of rhetorical alternatives that helps us form personal realities in which we can operate (Cherwitz, 1977, p 209).

Testing Propositions

The technology of criticism is not the same as building a piece of machinery. For one thing, advice is commonly particularized. Teacher/critics really do not seek general propositions resulting in universal success. The uniqueness of personal experience and point of view constrains the teacher/critic to select applicable advice from general areas. It is from those general areas that hypotheses about the given case. The general areas may contain scientific findings along with the experiential, vicarious and mythological statements that a given teacher has gleaned. The idea is to attempt to modify some aspect of behavior that is connected to eventual success. There are certain aspects that cannot be modified such as the performer's heights or hair color, or intrinsic body functions. There are other aspects of behavior that are so difficult to modify that it might not be worth the effort. Thus, it is the teacher/critic's judgment that guides the development of hypotheses about which changes might best serve the student's goals.

Furthermore, the teacher/critic has the difficult task of convincing the student that change is 1) desirable, 2) possible, 3) potentially effective. If the student accepts the suggestion and modifies behavior, the teacher/critic must adjudicate and explain 1) whether the change was sufficient to bring about the desired result, 2) whether the change was sufficient but did not bring about the desired result, and if so, 3) why the change did not bring about the desired result. In order to handle this task effectively, the teacher requires questions that can be applied in every case, the answers to which may differ in each case. We will now examine the five original propositions to see how the teacher might test available propositions for their efficacy as critical guides.

Speech is a goal directed enterprise. It is common practice in public speaking classes to require students to choose topics. In fact, most public speaking books contain chapters on how to pick a topic. This practice may well thwart testing the original proposition. Fry (1979) says "...expression...in speech is mediated by the brain, which provides instructions in its program for speech production." If this is so then the proposition is not in doubt. Refinement is required, however, to stipulate the goal that students should recognize that consciously selected goals implemented through planned talk can result in generally successful goal accomplishment. Requiring the student to choose a topic without constructing a realistic setting means that the prime criterion for choice could well be pleasing the teacher. This is certainly a reasonable objective given the circumstances that prevail in most classes. The main proposition can be tested by examining the reasons offered for topic selection and checking them against the findings from experiments in persuasion, persuasability, machiavellian and related concepts. If it can be demonstrated that the student has selected a topic for reasons that concord with findings, then his speech behavior can be guided with directives aimed at successful goal accomplishment.

In a formal speech setting where the speaker hopes to accomplish a legitimate objective with an audience, effective behavior can be identified as behavior which evoked smiles, nods, applause or other signs of approval from the audience. While this does not mean that objectives like attitude change or behavior change will necessarily be accomplished, it does offer a sign of acceptability of the discourse amenable to analysis and subsequent revision. If the speech is directed at winning approval from the teacher, it is a relatively easy task for the teacher to introspect and identify those components he found influential. Subsequently, teacher and student might select various approvable aspects of the speech to the teacher and test them in more realistic audience settings to obtain a probability estimate of their being generally effective for the speaker. Furthermore, given case aspects

of particular behaviors can be checked by observing which are effective with particular audiences.

The same model could be used to discover behaviors which are counter-productive. Connection between particular behaviors and goals accomplishment would require conscious specification of a goal leading to the construction of some kind of device to measure its accomplishment. Objectives requiring minimal activity on the part of the audience would result in the most refined kind of observation. Objectives specifying abstract attitude shifts would be virtually unmeasurable.

Such a pattern of analysis would lead to a process of small behavior changes on the part of the speaker and would obviate advisories like "be more direct" or "display more vocal variety." In general, broad advice appears to be unsuitable for empirical test of the type proposed.

Speech is a process and a relationship. People in our society have been trained to infer the nature of a relationship from observations of behavior of others (Goffman, 1959). There is considerable evidence that particular words and phrases reveal unconscious attitudes and goals (Feldman, 1959). To discover effective interpersonal behavior would require close observation of natural response behavior in a pair of communicating persons and checking for attitude change or change in feelings that can be ascribed to particular observed behaviors.

Each speaker would develop a particular way of representing generally approved communication signs of approved social attitudes (Goody, 1978). The problem for investigation would be to discover whether the receiver of communication accepted the behaviors as the speaker intended them.

Because interpersonal behavior is considerably less formal and premeditated than platform speaking, it would be difficult to effect this kind of research in natural state discourse. However, by examining the relational impact of various behaviors on a listening audience, inferences can be developed about the possible

effects of particular behaviors on various individuals.

Of particular importance would be the discovery of behaviors incompatible with the speakers' objectives, that is, behaviors which were intended to accomplish one effect but gain another instead. Unskilled speakers have a tendency to be ineffective at getting intonation and expression to coordinate with verbal meaning (Phillips, in press). Identification of types of attitude situations in which ineffectiveness is most pronounced would serve as a basis for corrective advice.

The social milieu in which speech takes place restrains and constrains the speaker. The word "norm" is a hypostatization that refers to what is deemed fit and proper in a given situation. Blair (1836, p 447) in particular was concerned with getting speakers "...to lay emphasis with exact propriety...a constant exercise of good sense and attention." If Sullivan's analysis of personality (Casson, 1969, p 25) is accurate, then it is important to help speakers make adjustments in their verbal output that would evoke appropriate images from their listeners. Impropropriety in social situations tends to alienate those whose identities are based on proper play in a given case.

Examination of scientific propositions about what social groups expect from their members would be a useful first step in research in this area. This must be followed by devising some method of quickly examining given cases to discover major expectations and major taboos in particular. The question of how a person wins approval in a given situation is crucial to the success of a speaker, whether on the platform or in social circumstances.

Henry's (1971) effort to discover the kinds of negotiation that takes place in close relational units indicated that a great deal of adjustment goes on in families, if, and only if, the members understand what signs indicate approval and which indicate disapproval. If a speaker attempts to present in a manner suitable to one group which alienates members of another group, he will be, at best, grudgingly tolerated out of courtesy. Thus, generalization about such

abstractions as "role" appear relatively useful as guides to advisories for speakers. The important effort appears to be needed to device ways and means of guiding speakers to size up particular situations. Some heuristics-producing generalizations may be available in simple anthropological literature. Use of the heuristics in given cases requires hypothesis-testing similar to that advocated in the previous section.

The speaker selects his rhetorical behavior from a pool of possibilities.

The computer model is often used to describe the data processing employed by humans when they engage in conscious thought. Recent studies, however, indicate that such an analogy may be inappropriate. In the first place, Penfield (1975) denies the possibility that mind can be understood. Geschwind (1979) notes that humans are capable of vast multi-dimensional thinking, while the output, communication is essentially linear. Thus, vast bodies of thought are simply not exposed to listeners.

Furthermore, the computer analogy presumes that the human knows where information is stored. Thus, presumably, he can assess a situation to see what it requires and move quickly to the proper storage bin to find the best available piece of persuasion. What is more likely, however, is that storage is relatively random and speakers are guided to storage spots by contingencies developed by their own process of observation. Relatively random (or at least unpredictable) processes defy available research models (Wilks, 1961). This, what is required is a body of criticism designed to help speakers reduce the entropy of randomness.

Student speakers tend to believe that conscious efforts to control the behavior of others through speech is manipulative and hence, unethical (Phillips, in press). Once this resistance is overcome, however, it is relatively easy to get them to devise hypotheses about the type of documentation or support a particular person would prefer. Generalizations about how to discover working epistemological preferences would be a most productive source of critical advice.

A perpetual audit of effectiveness is carried on by the speaker. It is part of the folk wisdom of public speaking that the extemporaneous mode of delivery will enhance the possibility of adaptive behavior by the speaker. The problem of adaptation to audience feedback is better described as reaction. It is clear that speakers respond to the expressions of the audience, but often their response is to cease to make an effort to overcome negative data. It is necessary to find a way to control input from a responding audience so that the speaker can draw conclusions from it and control adaptations to reinforce behavior which evokes positive response and suppress behaviors which appear to antagonize the audience. This is far from the simple business of "adapting" implied by most of the common public speaking lore.

In fact, a psychiatrist once remarked that the ability to monitor listener behavior and adapt to it while carrying on conversation is schizophrenic. Certainly it appears to require the reservation of a portion of the brain so that it does not participate in an on-going process, but rather devotes itself to analysis of the on-going process and transmission of proper advisories for adjustment of behavior. The brain is theoretically capable of doing this (Penfield, 1975) but it is not clear how it is done outside of closely controlled laboratory conditions.

Ernest Becker (1972) believes that people are capable of running "inner newsreels" in their heads through which they play out scenarios of future behavior and develop their most effective responses to possible situations. This is a fetching and virtually untestable proposition, although personal testimony from individuals seems to indicate that most people engage in future fantasies of one sort or another. Some will even declare that they use the fantasies as a source of guidance to their own behavior in situations similar to those fantasized. A research effort designed to test the extent of this process which would generate

hypotheses about how the process might be carried on during discourse.

Conclusions

One point seems clear: regardless of where the teacher/critic derives critical advisories, the proper use of criticism requires a scientific approach characterized by the development and test of hypotheses about the effect of particular changes and positively defined outcomes. Broad critical advisories so common in criticism of speech performance appear to be of little utility in scientific investigation. Rather, small behaviors, particular intonations, movements, small units of organization, and delivery patterns appear more amenable to empirical test.

In general, the teacher/critic tests the hypothesis that a particular behavior will evoke a particular result and conversely, that elimination of a particular behavior will eliminate a particular result. The connection between this kind of hypothesis testing and finding the available means of persuasion in the given case is too fortuitous to ignore. The student speaker represents a population of behaviors each of which is amenable to some kind of experimental analysis. The task of the teacher/critic is to derive sound advice from scientists who study behavior in general as a basis for particular hypothesis about behavior of a given person in a given case.

Sound consumership of science requires an understanding of the limits of investigation of the boundaries of inference. Application of an understanding of the nature of scientific investigation to the derivation of critical principles acts as a method of criticism of generalizations, so that even if a false or useless generalization is selected by teacher/critic, individually testing it with particular speakers can provide an empirical base for decisions about its utility.

References

- Arnold, C. C. Criticism of Oral Rhetoric. Columbus: C. C. Merrill, 1974.
- Bakan, D. Psychology can now kick the science habit. Psychology Today. March, 1972.
- Baker, W. O. Science and Technology. Daedalus. 109, 1. Winter, 1980. Pp 83-110.
- Baltimore, D. Limiting science: a biologist's perspective. Daedalus. 107, 2, 1978. Pp 37-46.
- Bartley, III, W. W. The Retreat of Knowledge. New York: Alfred A. Knopf, 1962.
- Becker, E. The Birth and Death of Meaning. New York: The Free Press, 1972.
- Bernal, J. D. Science in History. (Four volumes). Cambridge: Massachusetts Institute of Technology Press, 1965.
- Blair, H. Lectures on Rhetoric and Belle Lettres. London: William Sills, 1836.
- Brooks, H. Technology, evolution and purpose. Daedalus. 109, 1, 1980. Pp 65-82.
- Campbell, D. T. On the conflicts between biological and social evolution and between psychology and moral tradition. American Psychologist. December, 1975. Pp 1103-1126.
- Caplan, A. L. The Sociobiology Debate. New York: Harper and Row, 1978.
- Carpenter, F. A Skinner Primer. New York: The Free Press, 1974.
- Carson, R. C. Interaction Concepts of Personality. Chicago: Aldine Publishing Co., 1969.
- Chein, I. The Science of Behavior and Images of Man. New York: Basic Books, 1972.
- Cherwitz, R. Rhetoric as a way of knowing: an attenuation of the epistemological claims of the 'New Rhetoric.' Central States Speech Journal. 28, 1, 1977.
- Christie, R. Reconsiderations: the 'Authoritarian Personality.' Human Nature. 1, 4, 1978. Pp 90-93.
- Edel, A. Exploring Facts and Value: Science, Ideology and Value. New Brunswick: Transaction Press, 1980.
- Edel, A. Analyzing Concepts in Social Science: Science, Technology and Value. New Brunswick: Transaction Press, 1979.

Education Daily. December 5, 1978.

Farber, L. Lying, Despair, Jealousy, Envy, Sex, Suicide, Drugs and the Good Life. New York: Basic Books, 1969.

Sandor Feldman. Mannerisms of Speech and Gestures in Everyday Life. New York: International Universities Press, 1959.

Fry, D. How can you say that? Human Nature. 2,2,1979.

Geschwind, N. Specializations of the human brain. in Scientific American, The Brain. San Francisco: W. W. Freeman 1973 Pp 108-117

Goffman, E. Presentation of Self in Everyday Life. New York: Doubleday Anchor, 1959.

Goody, E. (Ed) Questions and Politeness: Strategies in Social Interaction. Cambridge: Cambridge University Press, 1978.

Gouldner, A. W. Sociology today does not need a Karl Marx or an Isaac Newton: It needs a V. I. Lenin. Psychology Today. September, 1971.

Henry, J. Pathways to Madness. New York: Random House, 1971.

Humphery, N. K. The origins of human intelligence. Human Nature 1, 12, 1978.

Huppe, B. and Kaminsky, J. Logic and Language. New York: Random House, 1957.

Jaynes, J. The Origins of Consciousness in the Breakdown of Bicameral Mind. Boston: Houghton, Mifflin 1976.

Judson, H. F. Anna's of science, I, New Yorker. Nov. 17, 1978. Pp 46-125; II, Dec. 4, 1978. Pp 89-191; III, December 11, 1978. Pp 122-199.

Kaplan, A. The Conduct of Inquiry. San Francisco: Chandler Publishing Co., 1964.

Koch, S. Psychology cannot be a coherent science. Psychology Today, Sept., 1969.

Kuhn, T. S. The Structure of Scientific Revolutions. Chicago: University of Chicago Press, 1960.

Kwant, R. Critique: Its Nature and Function. Pittsburgh: Duquesne University Press, 1967.

Landes, D. The creation of knowledge and technique: today's task and yesterday's experience. Daedalus. 109, 1, 1980. Pp 111-120.

Miller, G. On turning psychology over to the unwashed. Psychology Today. December, 1979.

Moynihan, D. P. Eliteland. Psychology Today. Sept., 1970.

Nisbet, R. Sociology as an Art Form. London: Oxford University Press, 1976.

O'Flaherty, W. D. Inside and outside the mouth of God: the boundary between myth and reality. Daedalus 109, 2, 1980.

Ogilvie, J. The Many Dimensional Man: Decentralizing Self, Society and the Sacred. New York: Oxford University Press, 1977.

Overington, M. A. The scientific community as audience: toward a rhetorical analysis of science. Philosophy and Rhetoric. 10 3, 1977. Pp 143-164.

Parsons, H. M. Reexamining the Hawthorne Effect Science. 183, 4128, 1974. Pp 922-32.

Penfield, W. The Mystery of the Mind. Princeton: Princeton University Press, 1975.

Phillips, G. M. Help for Shy People. Englewood Cliffs: Prentice Hall, In press.

Phillips, G. M. Rhetoric and the proper study of man. Communication Education. 27, Sept., 1978. Pp 195-200.

Phillips G. M. Rhetoric and its alternatives as bases for examination of intimate communication. Communication Quarterly. 24, 1, 1976.

Phillips, G. M. Introduction to the 'OG' Principle of research. in K. Johnson (ed.) Research Designs in General Semantics. New York: Gordon and Breach, 1974.

Phillips, G. M. and Metzger, N. J. Intimate Communication. Boston: Houghton and Mifflin, 1976.

Report on Education Research. X, October 23, 1978.

Rothstein, P. F. Evidence. St. Paul: West Publishing Co., 1970.

Sarbin, T. R. The scientific status of the mental illness metaphor. in S. C. Plog and R. B. Edgerton, Changing Perspectives in Mental Illness. New York: Holt Rinehart and Winston, 1969. Pp 9-30.

Skinner, B. F. About Behaviorism. New York: Alfred A. Knopf, 1973.

Skinner B. F. Beyond Freedom and Dignity. New York: Alfred A. Knopf, 1971.

Swazey, J. P. Protecting the 'animal of necessity:' Limits to inquiry in clinical investigation. Daedalus. 107, 2, 1978. Pp 129-146.

Warwick, D. P. Social scientists ought to stop lying. Psychology Today. February, 1975.

Weimer, W. B. Science as a rhetorical transaction: toward a nonjustificational concept of rhetoric. Philosophy and Rhetoric. 10, 1, 1977. Pp 1-29.

Wert, J. W. et.al. Statistical Methods in Educational and Psychological Research. New York: Appleton-Century-Crofts, 1954.

Wheeler, H. (Ed) Beyond the Punitive Society. San Francisco: W. H. Freeman, 1973.

Wheelis, A. The End of the Modern Age. New York: Harper and Row, 1971.

Wilks, S. S. Some aspects of quantification in science. in W. H. Woolf (Ed) Quantification: History of the Meaning of Measurement in the Natural and Social Sciences. Indianapolis: Bobbs Merrill Co., 1961.

Wilson, E. O. On Human Nature. Cambridge: Harvard University Press, 1978

Wilson, E. O. The Insect Societies. Cambridge: Belknap Press of Harvard 1972.